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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/828,564

04/06/2001

Yogendra Joshi

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EXAMINER

PATEL, NIHIR B

ART UNIT

PAPER NUMBER

3772

MAIL DATE

DELIVERY MODE

12/03/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/828,564

Applicant(s)	
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JOSHI ET AL.

Examiner

Nihir Patel

Art Unit	
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3772

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06.06.2007.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4-6, 8-10, 12-38 and 46 is/are pending in the application.
4a) Of the above claim(s) 4-6 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23-38 is/are allowed.
- 6) ☒ Claim(s) 8-10, 12-22 and 46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claims 8-10, 12-38 and 46 is withdrawn. Rejections based on the newly cited reference(s) follow.
2. Claims **23-38** are allowed. The prior art does not teach a condenser comprising a first wall extending from each evaporator plate, the first wall having an interior surface, a proximate edge and a distal edge, the proximate edge sealingly joined to the periphery of the respective plate, and the first wall extending perpendicularly from the entire periphery of each plate in a direction away from the central plane for a substantially constant distance, whereby the distal edge is substantially parallel to the plates; a second wall extending from each respective first wall, each second wall having an interior surface, a proximate edge and a distal edge, the proximate edge of each second wall sealingly joined to an extending perpendicularly from the entire distal edge of the adjoining first wall in a direction away from the evaporator volume; and a third wall extending from each respective second wall, each third wall having an interior surface, a proximate edge and a distal edge, the proximate edge of each third wall sealingly joined to and extending perpendicularly from the entire distal edge of the adjoining second wall such that the distal edges of the respective third walls abut and sealingly join at the central plane, whereby the interior surfaces of the first, second, and third walls define a condenser volume in fluid communication with the evaporator volume.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims **8-10, 12-22 and 46** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghoshal (US 6,474,074) in view of Anderson et al. (US 5,761,037).

6. As to **claim 8**, Ghoshal substantially discloses an apparatus that comprises a central evaporator **2** (see **column 2 lines 60-68**) in contact with the heat-dissipating component (see **figure 3**); a condenser **225** in fluid communication with and extending around the periphery of the evaporator (see **figure 3**); a liquid coolant partially filling the condenser and substantially filling the evaporator (see **figure 3**) but does not disclose a boiling enhancement structure disposed within the evaporator, wherein the boiling enhancement structure is a porous component that provides re-entrant cavities and wherein the boiling enhancement structure comprises a plate having a first major surface and a second major surface, both surfaces having parallel grooves cut in them, the grooves in the first surface being perpendicular to the grooves in the second surface; and means for cooling the condenser. Anderson teaches an apparatus that does provide a boiling enhancement structure disposed within the evaporator, wherein the boiling enhancement structure is a porous component that provides re-entrant cavities and

wherein the boiling enhancement structure comprises a plate having a first major surface and a second major surface, both surfaces having parallel grooves cut in them, the grooves in the first surface being perpendicular to the grooves in the second surface; and means for cooling the condenser (**see figure 1**). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Ghoshal's invention by providing a boiling enhancement structure disposed within the evaporator, wherein the boiling enhancement structure is a porous component that provides re-entrant cavities and wherein the boiling enhancement structure comprises a plate having a first major surface and a second major surface, both surfaces having parallel grooves cut in them, the grooves in the first surface being perpendicular to the grooves in the second surface; and means for cooling the condenser as taught by Anderson in order to improve the heat transfer process.

7. **As to claim 9**, Ghoshal substantially discloses the claimed invention; see rejection of claim 8 above, but does not disclose grooves in each surface that are cut to a depth that is at least one half of the thickness of the boiling enhancement structure plate. Anderson teaches an apparatus that does provide grooves in each surface that are cut to a depth that is at least one half of the thickness of the boiling enhancement structure plate (**see figure 1**). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Ghoshal's invention by providing grooves in each surface that are cut to a depth that is at least one half of the thickness of the boiling enhancement structure plate as taught by Anderson in order to improve the heat transfer process.

8. **As to claim 10**, Ghoshal substantially discloses the claimed invention; see rejection of claim 8 above, but does not disclose the boiling enhancement structure material selected from the

group consisting of copper, diamond, and silicon. Anderson teaches an apparatus that does provide boiling enhancement structure material selected from the group consisting of copper, diamond, and silicon (**see claim 4**). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Ghoshal's invention by providing boiling enhancement structure material selected from the group consisting of copper, diamond, and silicon as taught by Anderson in order to improve heat transfer process.

9. **As to claims 12, 15 and 16**, Ghoshal substantially discloses an apparatus that comprises a central evaporator **210** in contact with the heat-dissipating component (**see figure 3**); a liquid coolant partially filling the condenser and substantially filling the evaporator (**see column 2 lines 35-45**), but does not disclose an evaporator comprising a first plate having an interior major surface and an exterior major surface; a second plate, generally parallel to, spaced from, and similar in planar surface, the interior major surface opposing the interior major surface of the first plate, with a central parallel plane passing through the space therebetween, the second plate exterior major surface in contact with at least a portion of the component and extending outside the limits of that portion of the component, wherein the interior major surface define an evaporator volume and a boiling enhancement structure disposed within the evaporator, wherein the boiling enhancement structure is a porous component that provides re-entrant cavities; and means for cooling the condenser. Anderson teaches an apparatus that discloses an evaporator comprising a first plate **104** having an interior major surface and an exterior major surface; a second plate, generally parallel to, spaced from, and similar in planar surface, the interior major surface opposing the interior major surface of the first plate **105**, with a central parallel plane passing through the space therebetween, the second plate exterior major surface in contact with

at least a portion of the component and extending outside the limits of that portion of the component, wherein the interior major surface define an evaporator volume (**see column 3 lines 40-55**) and a boiling enhancement structure disposed within the evaporator, wherein the boiling enhancement structure is a porous component that provides re-entrant cavities; and means for cooling the condenser (**see figure 1**). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Ghoshal's invention by providing an evaporator comprising a first plate having an interior major surface and an exterior major surface; a second plate, generally parallel to, spaced from, and similar in planar surface, the interior major surface opposing the interior major surface of the first plate, with a central parallel plane passing through the space therebetween, the second plate exterior major surface in contact with at least a portion of the component and extending outside the limits of that portion of the component, wherein the interior major surface define an evaporator volume and a boiling enhancement structure disposed within the evaporator, wherein the boiling enhancement structure is a porous component that provides re-entrant cavities; and means for cooling the condenser as taught by Anderson in order to improve the heat transfer process.

10. **As to claim 13**, Ghoshal substantially discloses the claimed invention; see rejection of claim 12 above, but does not disclose second plate that further includes an opening that places the heat-dissipating component in direct contact with the liquid coolant, and the second plate sealingly engages the component. Anderson teaches an apparatus that does provide a second plate that further includes an opening that places the heat-dissipating component in direct contact with the liquid coolant, and the second plate sealingly engages the component (**see figure 2**). Therefore, it would have been obvious to one having ordinary skill in the art at the time the

invention was made to modify Ghoshal's invention by providing a second plate that further includes an opening that places the heat-dissipating component in direct contact with the liquid coolant, and the second plate sealingly engages the component as taught by Anderson in order to improve the heat transfer process.

11. **As to claim 14**, Ghoshal substantially discloses the claimed invention; see rejection of claim 12 above, but does not disclose a second plate that is formed with at least a portion of the heat-dissipating component from a single piece of material. Anderson teaches an apparatus that does provide a second plate that is formed with at least a portion of the heat-dissipating component from a single piece of material (**see column 3 lines 40-55**). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Ghoshal's invention by providing a second plate that is formed with at least a portion of the heat-dissipating component from a single piece of material as taught by Anderson in order to improve the heat transfer process.

12. **As to claim 17**, Ghoshal substantially discloses the claimed invention; see rejection of claim 12 above, but does not disclose a central plane that is horizontal and the first plate is above the second plate, the liquid coolant fills the evaporator. Anderson teaches an apparatus that comprises a central plane that is horizontal and the first plate is above the second plate, the liquid coolant fills the evaporator (**see column 3 lines 40-55**). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Ghoshal's invention by providing a central plane that is horizontal and the first plate is above the second plate, the liquid coolant fills the evaporator as taught by Anderson in order to improve the heat transfer process.

13. As to **claims 18-22**, Ghoshal substantially discloses the claimed invention; see rejection of claim 12 above, but does not disclose an evaporator wherein at all orientations it is full of liquid coolant. Anderson teaches an apparatus that does provide an evaporator wherein at all orientations it is full of liquid coolant (**see column 4 lines 30-45**). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Ghoshal's invention by providing an evaporator wherein at all orientations it is full of liquid coolant as taught by Anderson in order to improve the heat transfer process.

14. As to **claim 46**, Ghoshal substantially discloses an apparatus that comprises a central evaporator **210** in contact with the heat-dissipating component (**see figure 3**); a condenser **225** in fluid communication with and extending around the periphery of the evaporator (**see figure 3**); a liquid coolant partially filling the condenser and substantially filling the evaporator (**see column 2 lines 30-45**) means for cooling the condenser (**see figure 3**), but does not disclose an evaporator that comprises a first plate having an interior major surface and exterior major surface; and a second plate, generally parallel to, spaced from, and similar in planar dimension to the first plate, having an interior major surface and an exterior major surface, the interior major surface opposing the interior major surface of the first plate, with a central parallel plane passing through the space therebetween, the second plate exterior surface in contact with at least a portion of the component and extending outside the limits of that portion of the component, wherein the interior major surfaces define an evaporator volume and wherein the at all orientations the evaporator is substantially full of liquid coolant. Anderson teaches an apparatus that provides an evaporator that comprises a first plate **104** having an interior major surface and exterior major surface; and a second plate **105**, generally parallel to, spaced from, and similar in

planar dimension to the first plate, having an interior major surface and an exterior major surface, the interior major surface opposing the interior major surface of the first plate, with a central parallel plane passing through the space therebetween, the second plate exterior surface in contact with at least a portion of the component and extending outside the limits of that portion of the component, wherein the interior major surfaces define an evaporator volume (see column 3 lines 40-55) and wherein the at all orientations the evaporator is substantially full of liquid coolant (see column 4 lines 30-45). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Ghoshal's invention by providing an evaporator that comprises a first plate having an interior major surface and exterior major surface; and a second plate, generally parallel to, spaced from, and similar in planar dimension to the first plate, having an interior major surface and an exterior major surface, the interior major surface opposing the interior major surface of the first plate, with a central parallel plane passing through the space therebetween, the second plate exterior surface in contact with at least a portion of the component and extending outside the limits of that portion of the component, wherein the interior major surfaces define an evaporator volume and wherein the at all orientations the evaporator is substantially full of liquid coolant as taught by Anderson in order to improve the heat transfer process.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nihir Patel whose telephone number is (571) 272-4803. The examiner can normally be reached on 7:30 to 4:30 every other Fridays off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patricia Bianco can be reached on (571) 272-4940. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit 3772



Nihir Patel



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